

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
7 October 2004 (07.10.2004)

PCT

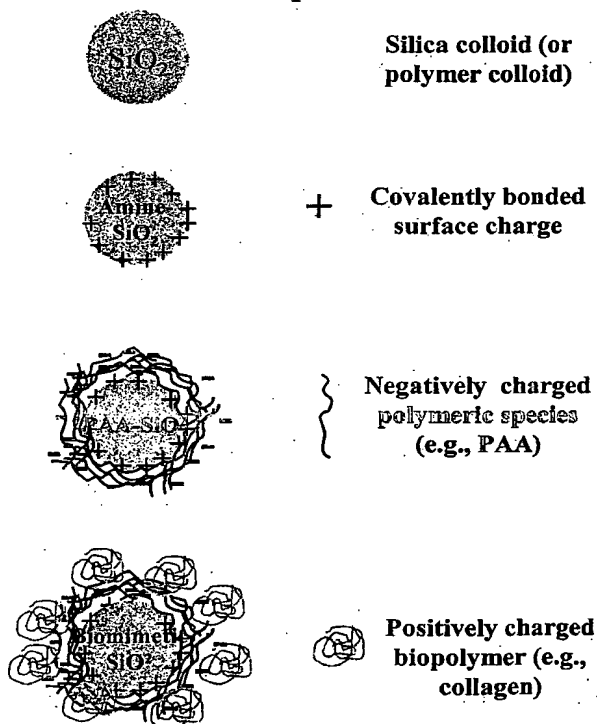
(10) International Publication Number
WO 2004/085998 A2

- (51) International Patent Classification⁷: **G01N**
- (21) International Application Number: **PCT/US2004/009192**
- (22) International Filing Date: 26 March 2004 (26.03.2004)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
60/458,258 28 March 2003 (28.03.2003) US
- (71) Applicants (for all designated States except US): **THE CHILDREN'S HOSPITAL OF PHILADELPHIA** [US/US]; 34th Street and Civic Center Boulevard, Philadelphia, PA 19104 (US). **THE TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA** [US/US]; 3160 Chestnut Street, Suite 200, Philadelphia, PA 19104 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **SHASTRI, Venkatram, P.** [IN/US]; 1134 N. Bethlehem Pike, Lower Gwynedd, PA 19002 (US). **CHEN, I-Wei** [US/US]; 801 Yale Avenue #403, Swarthmore, PA 19081 (US). **ZNIDARSIC, William** [US/US]; 4045 Baltimore Avenue, Apt. C-1, Philadelphia, PA 19104 (US).
- (74) Agent: **VOLIN, Marina, E.**; Caesar, Rivise, Bernstein, Cohen & Pokotilow, Ltd., Seven Penn Center, 12th Floor, 1635 Market Street, Philadelphia, PA 19103 (US).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,

[Continued on next page]

(54) Title: **BIOMIMETIC HIERARCHIES USING FUNCTIONALIZED NANOPARTICLES AS BUILDING BLOCKS**

Flow Chart for Biomimetic Assembly on Nanoparticles



(57) Abstract: The invention provides a three-dimensional construct including a polymeric matrix and a nanoparticle as shown in Fig. 1 having a diameter of about 5 nm to about 10 microns, wherein the nanoparticle is (a) coated with at least two monomolecular layers each carrying biological information and (b) dispersed in the polymeric matrix at a density of at least 0.01 vol%. The invention further provides a method of presenting biological information to a cell or a tissue and thereby affecting at least one parameter of the cell or the tissue, the method involves providing the three-dimensional construct and contacting it with the cell or the tissue to present the biological information and thereby affecting at least one characteristic of the cell or the tissue. In certain embodiments, the diameter, the biological information and the density are selected to affect at least one characteristic of the cell or the tissue.



TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK,

Published:

— *without international search report and to be republished upon receipt of that report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.